

Purpose: Develop an image based method to measure electron beam spot position w.r.t the Collimator Axis Of Rotation (CAOR).

Methods: Two stainless steel rods, 3 mm in diameter, are mounted in a jig attached to the linac collimator. The rods lay in different planes normal to the CAOR, one at 159 cm SSD and the other at 70 cm SSD, and are offset 10 and 6 cm from the CAOR respectively. Images of both rods are acquired at multiple coll rotations. At each angle the rods project a tangent to an inscribed circle, the centre of which is calculated. The lower rod is very close the plane of the EPID and the centre of its inscribed circle defines the mechanical CAOR. The centre of the inscribed circle calculated from multiple images of the upper rod will be displaced from the CAOR by some distance proportional to the distance the beam source is from the CAOR. Test measurements were performed on an Elekta 6 MV where the In Plane beam spot position was moved a known distance using steering fine and beam spot position was measured.

Results: Independent beam spot measurement (Flexmap Image Registration ball bearing) reported the initial beam spot at 0.29 mm from CAOR, moving to 0.91 mm ($\Delta = 0.62$ mm) with steering. The rod tests showed the initial beam spot to be .31 mm from the CAOR and 1.17 mm from CAOR after adjustment. Note that in our companion paper we report similar values (initial 0.13mm going to 0.92 mm and initial value of 0.09mm going to 0.79) with our two co-rotational dosimetric beam spot tests.

Conclusions: A simple method for measuring beam spot position with respect to CAOR is described. It provides its own internal reference and could be incorporated into routine QA using the EPID.

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